

5 Heart Block

(LSD Loves Company)

- Lyme Disease
- Salmonella
- Chagas
- Legionella
- Diphtheria

Reiter's Syndrome

- Shigella
- Yersinia
- Crohn's
- IBD
- Chlamydia

Low Complement Bugs

(I AM HE)

- Influenza
- Adenovirus
- Mycoplasma
- Hep B & C
- EBV

Drugs Induced SLE

(HIPPE)

- Hydralazine
- INH
- Procainamide
- Penicillamine
- Phenytoin
- Ethosuximide

Drugs that blast BM

- AZT
- Benzene
- Chloramphenicol
- Vinblastin

Common Shaped Bugs

- Vibrio
- Campylobacter
- Listeria
- H. pylori

Chinese Letters

Corynebacter

Crescent Shaped Protozoa

Giardia Lamblia

TB Treatments

(RESPI)

- Rifampin
- Ethambutol
- Streptomycin
- Pyrozinamide
- INH

*6 Low Complement

Associated Nephrotic

Syndromes

- Serum Sickness
- SLE
- SBE
- PSGN
- MPGN II
- Cryoglobulinemia.

Induce P450

(BAG for CpR QTS)

- Barbiturates
- Alcohol
- Griseofulvin
- Carbamazepine
- Rifampin
- Quinidine
- Tetracyclines
- Spironolactones

Inhibit P450

(I'D SMACK Quin)

- INH
- Dapsone
- Sulfa Drugs
- Macrolides
- Amiodarone
- Cimetidine
- Ketoconazole
- Quinolones

P450 Dependent

(WEPTeD)

- Warfarin
- Estrogen
- Phenytoin
- Theophylline
- Digoxin

SE of Statins

- Myositis
- Hepatitis
- ↑ Liver enzymes

Painful Genital

Lesions

- Herpes
- Chancroid (H. ducreyi)
- Lymphogranuloma venereum
- Lymphogranuloma inguinale

Disulfide Bonds

(PIGI)

- Prolactin
- Inhibin
- GH
- Insulin

Hookworms

- Necator Americanis
- Enterobius Vermicularis
- Ankylostoma Duodenale
- Trichuris Trichurium
- Ascaris Lumbricoides
- Strongyloides

X-linked Enzymes

Deficiencies

(Fabry and Lesh go Hunting for Candy, Pie and Gum)

- G6PD
- CGD (NADPH)
- Pyruvate DH
- Fabry's
- Hunter's
- Lesh-Nyhan

Screen Newborns

(Please Check Before Going Home)

- PKU
- Congenital Adrenal Hyperplasia
- Biotinidase
- Galactosemia
- Hypothyroidism

Action of Steroids

(KIISS)

- Kills T-cells and Eosinophils
- Inhibit MØ migration
- Inhibit Phospholipase A
- Inhibit mast cell degranulation
- Stabilizes endothelium
- Stimulates protein synthesis

Causes of Severe

Monocytosis (STELS)

- Salmonella
- TB
- EBV
- Listeria
- Syphilis

Macrolides

- Azithromycin
- Clarithromycin
- Erythromycin

1 dose Tx for

Chlamydia

Azithromycin

"Big Mama" Anaerobes

- Strep. Bovis
- Bacteroides fragilis
- C. melanog-septicus
- C. difficile

*If blood cultures show S. bovis or C. melanog-septicus = rule out colon cancer.

Tx for "Big Mama"

anaerobes

- Metranidazole
- Clindamycin
- Cefoxitin

Serum Values for Low

Volume State

- | | | |
|------|---|---|
| • K | - | ↓ |
| • Na | - | ↓ |
| • Cl | - | ↓ |
| • pH | - | ↑ |
| • BP | - | ↑ |

1 dose Tx for

Gonorrhea

- Ceftriaxone
- Cefixime
- Cefoxitin
- Ciprofloxacin
- Ofloxacin
- Gatifloxacin

Psammoma Bodies

- Papillary CA of Thyroid
- Serous Cystadenoma of ovary
- Meningioma
- Mesothelioma

Drugs that Cause

Cardiac Fibrosis

- Adriamycin
- Phen-Fen

Indication for PUD

surgery

- (IHOP)
- Intractable Pain
- Hemorrhage
- Obstruction
- Perforation

Urease +ive Bacteria

(PPUNCHES)

- Proteus
- Pseudomonas
- Ureaplasma urealyticum
- Norcardia
- Cryptococcus neoformans
- H. pylori
- S. saprofiticus

Drugs that Cause Pulmonary Fibrosis

(BBAT)

- Bleomycin
- Busulfan
- Amioderone
- Tocainide
- (methotrexate & cormustine)

Salmonella Typhi

- High fever
- Rose spots
- Intestinal fire
- Monosytosis
- Heart block

Drugs that cause Myositis

(RIPS)

- Rifampin
- INH
- Prednisone
- Statins

Encapsulated Bacteria

(Some Strange Killers Have Pretty Nice Capsules)

- Strep. Pneumo (gr. +)
- Salmonella
- Klebsiella
- H. Flu B
- Pseudomonas
- Neisseria
- Citrobacter

Encapsulated Yeast

Cryptococcus

Jones Criteria

(J♥NES)

- Polyarthritits (joints)
- Carditis (♥)
- Nodules subcutaneous
- Erythema marginatum
- Sydenham Chorea

IgA Nephropathies

- Henoch-Schoenlein Purpura (HSP)
- Berger's
- Alport's

Massive Eosinophilia

- (NAACP)
- Neoplasms
- Allergies/Asthma
- Addison's
- Collagen Vascular Disease
- Parasites

Risk Factors for Primary Liver Cancer

- Hep B and C
- Aflatoxin
- Vinyl Chloride
- Alcohol
- Carbon Tetrachloride
- Anyline dyes
- Smoking
- Hemochromatosis
- Benzene
- Schistosomiasis

9 Live Vaccines

- Measles
- Mumps
- Rubella
- Oral Polio
- Rotavirus
- Small Pox
- BCG
- Yellow Fever
- Varicella

Autoimmune Hemolytic Anemia

- PTU
- Cephalosporins
- α-methyl dopa
- Sulfa drugs
- Anti-malarials
- Penicillin

Autoimmune Thrombocytopenia

- Aspirin
- Heparin
- Quinidine

Pansystolic Murmurs

- Mitral Regurg.
- Tricuspid Regurg.
- Ventrical Septal Defect

Dihydrofolate

Reductase Inhibitors

- Pyremethamine/Sulfadiazine
- Trimethoprim/Sulfamethoxazole
- Methotrexate

Sulfa Containing Drugs

- Sulfonamides
- Sulfonlureas
- Celecoxib (COX2 inhibitor)

Silver Staining Bugs

- Legionella
- Pneumocystis
- H. pylori
- Bartonella henselae
- Candida

Blood Gas w Restrictive Lung Disease

- Tachypnea
- ↓ pCO₂
- ↓ pO₂
- ↑ pH

Blood Gas with Obstructive Lung Disease

- ↑ or Normal pO₂
- ↑ pCO₂
- ↓ pH

MI – Enzymes

Troponin I

- appears 2 hrs
- peaks 2 days
- gone 7 days

CKMB

- appears 6 hrs
- peaks 12 hrs
- gone 2 days

LDH

- appears 1 day
- peaks 2 days
- gone 3 days

MO Deficiency

- Chediak-Higashi
- NADPH-oxidase def

1 Dose Tx for H.ducreyi

- Azithromycin – 1gram
- Ceftriaxone – 250mg im

1 Dose Tx – Gardnerella

Metronidazole

SE of Thiazides and Loop diuretics

- Hyperglycemia
- Hyperuricemia
- Hypovolemia
- Hypokalemia

MØ in Various Tissues

Brain.....Microglia
Lung.....Type I Pneumo
Liver.....Kupffer
Spleen.....RES cells
Kidney.....Mesangial
LN.....Dendritic
Skin.....Langerhans
Bone.....Osteoclasts
CT.....Histiocytes
.....Giant cells
.....Epithelioid

Rashes of Palm & Soles (TRiCKSSSS)

- TSS (Toxic Shock)
- Rocky Mt. Spotted Fever
- Coxsackie A (Hand, Foot & Mouth Dis.)
- Kawasaki
- Scarlet Fever
- Syphilis
- Staph. Scalded Skin
- Streptobacillus moniliformis

4 Sources of Renal Acid

- Plasma (RTA)
- Ammonia production in the collection duct – 10% of Urea Cycle
- Glutaminase
- Carbonic Anhydrase

Hormones Produced by Small Cell CA of Lung

- ACTH (MC)
- ADH
- PTH
- TSH
- ANP

1 Dose Tx - Candidiasis

Ketoconazole – 150mg

1 Dose Tx – Vaginal Candidiasis

Diffucan – 1 pill

1 Dose Tx – Trichomonas

Metronidazole

Viruses Related to CA

HPV.....Cervical cancer
EBV.....Lymphoma
HVB.....Liver carcinoma
HVC.....Liver carcinoma
HIV.....Kaposi

NM Disease Concept

- Restrictive Blood Gas
- ↓ pO₂ ↓ pCO₂ ↑ pH
- ↑ RR
- ↑ Risk for Seizures
- ↓ Pulmonary Capillary Wedge pressure

PIE Syndrome

(Pulmonary Infiltrate with Eosinophilia)

- Necator Americanus
- Ascaris Lumbricoides
- Schistosomiasis
- Strongyloides
- Ankylostoma

Enzymes used by B12

- Methyl Malonyl CoA mutase
- Homocystine methyl transferase

Increased Susceptibility to pseudomonas and S. aureus

- Burn patients
- Cystic Fibrosis
- Diabetes
- Neutropenics

Crohn's Disease

(“GIFTS”)

- Granuloma
- Ileum
- Fistula
- Transmural
- Skip Lesions

Causes of Widened S2

- ↑ pO₂
- ↑ volume Rt. Ventricle
- Blood transfusion
- Supplemental O₂
- Rt. sided heart failure
- Pregnancy
- I.V. Fluids
- ASD (fixed)
- Deep breathing

Cavities of Blood Loss

- Pericardium
- Intracranial
- Mediastinum
- Pleural cavity
- Thighs
- Retroperitoneum
- Abdominal
- Pelvis

Negative Stranded RNA

- 1-3 week prodromal period before SX
- Must switch to positive stranded before it can replicate

Positive Stranded RNA

- Symptoms occur within 1 week or less
- Don't have to switch before replicating
- Exceptions – Hanta, Ebola and Yellow Fever which are negative stranded

Cyanotic Heart

Diseases

- Transposition of great arteries
- Tetralogy of Fallot
- Truncus Arteriosus
- Tricuspid Atresia
- Total Anomalous Pulmonary Venous Return
- Hypoplastic Left Heart Syndrome
- Ebstein's Anomaly
- Aortic Atresia
- Pulmonic Atresia

LL to Depolarize

- Hypermagnesemia
- Hypercalcemia (except Atrium)
- Hypokalemia
- Hyponatremia

ML to Depolarize

- Hypomagnesemia
- Hypocalcemia (except atrium)
- Hyperkalemia
- Hyponatremia

Hormones produced by the Placenta

- hCG
- Inhibin
- Human Placental Lactogen
- Oxytocin
- Progesterone
- Estrogen

Uses for Pilocarpine

- Cystic Fibrosis
- Closed angle Glaucoma

Cause Dysguzia

- Metronidazole
- Clarithromycin
- Zinc deficiency

Carcinoid Triad

- Flushing
- Wheezing
- Diarrhea

Dx by measuring 5-HIAA in the urine

Most common primary location = appendix

Most common metastatic location = pancreas, ileum

AVMs

machinery murmur

- **Heart:** PDA
- **Elbow:** dialysis fistula
- **Brain:** Von Hippel-Lindau
- **Lungs:** Osler-Weber-Rendu

Hemophilus Influenza

- Gram negative rods
- Pleomorphic
- “School of Fish”
- Type A = non-encapsulated, non-invasive, MCC of sinusitis, otitis, bronchitis
- Type B = encapsulated, invasive, IgA protease, MCC of epiglottitis

Rust Colored Sputum

- Strep. Pneumoniae (aka pneumococcus)

Staph. Epidermiditis

Most common infection of shunts and central lines

How do you tell

Catalase positive

Staphylococci apart?

(by pigment)

Aureus.....gold
Epidermidis.....white
Saprophyticus.....none

Strep. pyogenes

- MCC: all throat infections, lymphangitis, impetigo, necrotizing fasciitis, erysipelas, Scarlet fever
- 2nd MCC: all other skin infections

Neutrophil Deficiencies

- Job-Buckley Syn.
- NADPH Oxidase defic.
- Neutropenia
- Myeloperoxidase defic.

Compartment Syndrome

- Pain (always first)
- Pallor
- Polkiothermia
- Parathesia
- Pulselessness (always last)

Itchiest Rashes

- Scabies
- Lichen planus
- Urticaria
- Dermatitis herpetiformis

Oddities About Listeria

- Only gram positive w/ endotoxin
- Crosses placenta
- Lipid A is toxic part
- Causes granulomas
- Causes sepsis in neonates
- Raw cabbage, spoiled milk

B Vitamins

B1 – Thiamine

- Beriberi
- Weirnickes
- Korsacoff

B2 – Riboflavin

- Angular stomatitis

B3 – Niacin

- Pellagra
- 4 d's

B4 – Lipoic acid

B5 – Pantothenic acid

B6 – Pyridoxine

- seizures
- B9 – Folate
- B12 – Cobalamine
- pernicious anemia
- neuropathy

Periods of rapid growth

- Birth – 2 months
- 4 – 7 years
- Puberty

Only Immune

Deficiency with Low

Calcium

DiGeorge's Syndrome

Bugs with IgA Protease

- S. Pneumonia
 - H. Influenza
 - Neisseria
- (are resistant to IgA)

Secretions of Mast Cells

- Histamine
- Slow Reacting Substance of Anaphylaxis
- Eosinophil Chemotactic Factor of Anaphylaxis

Secretions of Eosinophil

- Histaminase
- Arylsulfatase
- Heparin

Actions of E.coli

- Secrete Vitamin K
- Secrete Biotin
- Secrete Folate
- Secrete Pantothenic acid
- Aids in absorption of B₁₂

Heart Block Clue

- Increased body temperature with a normal heart rate.
- HR should increase by 10bpm for every 1 degree increase in temperature

Macrophages

Release MHC II

T_{H1} Secrete

- IL-2
- IF- γ

T_{H2} Secrete

- IL-4
- IL-5
- IL-6
- IL-10

T_{H0} Secrete

- T_{H1}
- T_{H2}

T-Cytotoxic Cells

- CD-8 positive
- CD-4 negative
- Recognize MHC I
- Also have markers CD-2 and CD-3

T-Helper Cells

- CD-4 positive
- CD-8 negative
- Recognize MHC II
- Also have marker CD-2 and CD-3

Elevated Cholesterol

- Xanthanomas on extensor surfaces
- \uparrow risk for CAD

Elevated Triglycerides

- Xanthelasma on eyelids and face
- \uparrow risk of Pancreatitis

4 Causes of Severe Pain

- Pancreatitis (EtOH)
- Kidney Stones (bloody urine)
- AAA (ripping, tearing pain)
- Ischemic Bowel (bloody diarrhea)

5 Causes of SIADH

(SIADH)

- Small Cell Carcinoma
- \uparrow intracranial pressure
- A Pain
- Drugs
- Hypoxia

Cells of Neural Crest

Origin

(POT CLAMPS)

- Parafollicular cells
- Odontoblast
- Tracheal cartilage
- Chromaffin Cells
- Laryngeal cartilage
- All Ganglion cells
- Melanocytes
- Pseudounipolar cells
- Spiral membrane (♥)

Ions and the EKG

P-wave = Ca⁺⁺

QRS complex = Na⁺

S-T Interval = Ca⁺⁺

T-wave = K⁺

U-wave = Na⁺

Maximum Sinus Rate

220-age in years

Tri-Nucleotide Repeats

- Huntington's
- Fragile X
- Myotonic dystrophy
- Spinal/bulbar muscular atrophy (rare)

Low volume states with acidosis (not alkalosis)

- RTA
- Diarrhea

MCC Croup & Bronchiolitis

- Parainfluenza
- RSV (ER this is #1)
- Adenovirus
- Influenza

4 D's of Pellagra

- Dermatitis
- Diarrhea
- Dementia
- Death

Types of Kidney Stones

- Calcium oxalate - 80%
- Struvite
- Uric Acid
- Cysteine
- Oxalate

Pseudogout

- Ca⁺⁺ pyrophosphate
- + birefringent crystals
- Rhomboid crystals
- MC older patients
- Seen equally in both genders
- Tx = Colchicine

MC Non-cyanotic Congenital Heart Dis.

- VSD
- ASD
- PDA
- Coarctation of aorta

Enzymes NEVER seen in Glycolysis

Pyruvate carboxylase
PEP carboxykinase
Fructose-1,6-phosphatase
Glucose-6-phosphatase

Enzymes ONLY seen in Glycolysis

Hexokinase
Phosphofructokinase-1
Pyruvate kinase

Acid Fast Organisms

- Mycoplasma
- Norcardia (partially, gr+)
- Cryptosporidium (partially, protozoa)

Microsteatosis Causes

- Acetaminophen
- Reye Syndrome
- Pregnancy

Macrosteatosis Causes

- Alcohol

Bacteria with Elastase

- Staph. aureus
- Pseudomonas

Bacteria with toxins that inhibit EF-2

- Pseudomonas
- Diphtheria

Phage Medicated Toxins

(*Oh BED*)
"O" antigen (Salmonella)
Botulinum
Erythrogenic toxin
Diphtheria

Segmented Viruses

(*I sprayed ORTHO on BUNYA at the ARENA down in REO to kill SEGMENTED worms*)

- Orthoviridae
- Bunyaviridae
- Arenaviridae
- Reoviridae

Functions of Adhesion Molecules

- Lymphocytes homing
- Inflammation
- Cell-cell interaction

Esophageal/Gastric CA

Risk Factors

- Smoking
- Alcohol
- Nitrates
- Japanese

Bladder CA Risk

Factors

- Smoking
- Aniline dyes
- Benzene
- Aflatoxin
- Cyclophosphamide
- Schistosomiasis
- Von Hippel-Lindau
- Tubular Sclerosis

Structures with No

Known Function

- Appendix
- Epithalamus
- Palmaris longus
- Pancreatic Polypeptide

Progressing to RPGN

- Goodpasture's (#1)
- Diabetes Melitus
- Hypertension
- Wegener's

Causes of Papillary Necrosis

- Vasculitis
- AIDS

Gram Positive Spore Formers

- Bacillus anthracis
- Clostridium perfringens
- Clostridium tetani

Used for Cold

Agglutinin Testing

Strep. salivarius

Drugs that Cause

Disulfiram Reaction

- Chlorpropamide
- Lactams
- Antabuse
- Metranidazole

3 Toxins of Bacillus

- Lethal factor
- Protective factor
- Edema factor

Beta Blockers

B₁ Selective: A-M

(except C & L)

Nonselective: N-Z, C, L

Fanconi Syndrome

- Defect in proximal tubule
- Can't reabsorb
- Low energy state
- Can be caused by old tetracycline

Glutaminase

- In collecting duct
- Absorbs ammonia in the liver
- Cause of hepato-renal syndrome

3 Anatomical

Narrowings of Ureter

- Hilum
- Pelvic Brim
- Entrance of bladder

Odd MCC of Death

SLE, endometrial and cervical cancer – renal failure

Methotrexate Uses

- Dx Fragile X
- Tx Molar Pregnancy
- Tx Fast growing CA
- Tx Steroid resistant disease

Group D Streptococcus

Viridans – green pigment
– SBE

Mutans – Cavities

Sanguis

Salivaris

Bovis

Nephritis Syndrome

- Hypertension
- Hematuria
- RBC casts

Nephrotic Syndrome

- Edema
- Hyperlipidemia
- Hypercholesterolemia
- Hypercoagulability
- ↓ serum albumin
- ↑ urine albumin

MCC of Airway

Infection

(*sinusitis, otitis, bronchitis, pneumonia*)

#1 – S. pneumonia

#2 – H. influenza

#3 – N. meningitides

Gastroenteritis within 8

hours of eating

(*pre-formed toxin*)

- S. aureus (potato salads)
- C. perfringens (holiday turkey/ham)
- B. cereus (fried rice)

Citrobacter

Cause of multiple cerebral abscesses in newborns

MCC of UTI

#1 – E. coli

#2 – Proteus

#3 – Klebsiella

Most Frequent in

Females 5-10 yrs and

18-24 yrs

S. saprophyticus b/c they stick things inside themselves

S. aureus

MCC of osteomyelitis

MCC of infection in burn patients

MCC of Newborn

Meningitis

- Group B Strep
- E. coli
- Listeria

Bacteria Associated with Colon Cancer

- C. melanogosepticus
- S. bovis

Gram – that are strict Anaerobes

H. flu

Neisseria

Pre-renal Failure

Serum BUN > 20

Serum Cr > 40

Fractional Na exc. < 1%

Renal Failure

Serum BUN ~ 10 to 15

Serum Cr < 20

Fractional Na exc. > 2%

Extravasation

- Pavementing
- Margination
- Diapedesis
- Migration

If Cell Mediated is defective – tx for

- Viral
- Fungal
- Mycobacterium
- Protozoa
- Parasite
- Neoplasm

Herpes Viruses

- I – oral
- II – genital
- III – varicella zoster
- IV – EBV
- V – CMV
- VI – Roseola
- VII – Pityriasis rosea
- VIII – Kaposi's

Disease Picked up During Delivery

- Group B strep
- S. pneumonia
- Herpes
- N. gonorrhea
- Chlamydia

T & B-cell Deficiencies

- **WAS** – Thrombocytopenia, IL-4, Eczema, ↓ IgM
- **SCID** – Adenosine deaminase deficiency, T> B, frameshift/nonsense mutation, ↑ bacterial & fungal infx.
- **CVID** – Tyrosine kinase deficiency, Late onset, frameshift/missense mutation
- **HIV (HTLV-1)** – Effects CD-4 rich tissues (brian, testicles, cervix, rectum, blood vessels), T>B
- **Job-Buckley Syndrome** – red headed female, Tyrosine kinase deficiency

B-Cell Deficiencies

- Bruton’s Agammaglobulinemia – Trysine kinase deficiency
- Leukemias
- Lymphomas
- See above for those with T-cell overlap

T-Cell Deficiencies

- **DiGeorge’s** – hypokalemia, problem with 3rd and 4th pharyngeal pouches, deletion of chromosome 22
- **HIV**
- See above for those with B-cell overlap

Electron Transport Chain

- **Poisons**
 Complex I.....Amytal, Rotenone
 Complex II.....Malonate
 Complex III.....Antimycin
 Complex IV.....CN, CO, Chloramphenicol
 Complex V.....Oligomycin
- **Chemical Uncouplers**
 DNP
 Free Fatty Acids
- **Physical Uncouplers**
 Aspirin

Places where Amino Acids feed in/out of TCA Cycle

- Pyruvate.....Gly, Ala, Ser
- Acetyl CoA.....Phe, Iso, Thr, Tyr, Lys, Leu
- α-ketogluterate.....Glu, Gln
- Succinyl CoA.....Phe, Trp, Tyr
- Fumerate.....Pro
- Oxaloacetate.....Asp, Asn

Amino Acid Deficiencies

- **PKU** – Phenylalanine hydroxylase deficiency, needed to make tyrosine, leads to a lack of Dopamine, Epi and Norepi, melanin
- **Maple Syrup Urine Disease** – deficiency in branched amino acids (Leu, Lys, Val), defective transport in the kidneys
- **Cystinuria** – Cystathione synthase deficiency; cysteine, ornithine, lysine and Arginine end up in urine, stones

Amino Acid Abbreviations

Glycine	Gly	Threonine	Thr
Alanine	Ala	Cysteine	Cys
Valine	Val	Tyrosine	Tyr
Leucine	Leu	Asparagine	Asn
Isoleucine	Iso	Glutamine	Gln
Methionine	Met	Aspartic Acid	Asp
Phenylalanine	Phe	Glutamic Acid	Glu
Tryptophan	Trp	Lysine	Lys
Proline	Pro	Arginine	Arg
Serine	Ser	Histidine	His

Amino Acids Subgroups

- **Acidic:** Asp Glu
- **Basic:** Arg Lys
- **Sulfur Bonds:** Cys Met
- **O-Bonds:** Ser Thr Trp
- **N-Bonds:** Asp Gln
- **Branched:** Leu Iso Val
- **Bulky (Aromatic):** Phe Thr Trp
- **Smallest:** Gly
- **Responsible for Bends:** Pro
- **Ketogenic:** Lys Leu
- **Gluco- & Ketogenic:** Phe Iso Thr Trp
- **Glucogenic** His Arg Glu Asp Gln
 Asn Tyr Cys Pro Met
 Val Ala Gly

Essential Amino Acids

(PVT TIM HALL)

- Phe Trp His
- Val Iso Arg
- Thr Met Leu
- Lys

*****If there is a deficiency in **Phe** then **Tyr** becomes essential (like in PKU). If there is a deficiency in **Met** then **Cys** becomes essential*****

Restriction Enzymes

(Cut to the right unless otherwise specified)

- Trypsin.....Arg, Lys
- Chymotrypsin.....Phe, Tyr, Trp
- Elastase.....Gly, Ser, Ala
- Mercaptoethanol.....Met, Cys
- Aminopeptidase.....amino terminal
- Carboxypeptidase.....Left of carboxy terminal
- Cyanobromide.....Met

2nd Messengers

cAMP.....Sympathetic, catabolic, CRH
 cGMP.....Parasympathetic, anabolic
 IP₃/DAG.....Smooth muscle contraction by horm./NT
All hypothalamic hormones (except CRH)
 Ca:Calmodulin.....Smooth muscle contraction by distention
 Ca⁺⁺.....Gastrin
 Tyrosine Kinase...Insulin and all growth factors
 NO.....Nitrates, Viagra, ANP and LPS

Autoimmune Antibodies

Disease	Anti-
SLE	<ul style="list-style-type: none"> • Smith • Double stranded DNA • Cardiopilin
Drug Induced SLE	<ul style="list-style-type: none"> • Histone
Progressive Systemic Sclerosis	<ul style="list-style-type: none"> • Topoisomerase
Graves	<ul style="list-style-type: none"> • TSH Receptor
CREST	<ul style="list-style-type: none"> • Centromere
Goodpasture's	<ul style="list-style-type: none"> • Glomerular Basement Membrane • (aka. Type IV Collagen)
Primary Biliary Cirrhosis	<ul style="list-style-type: none"> • Mitochondria
Alopecia Areata	<ul style="list-style-type: none"> • Hair follicle
Rheumatoid Arthritis	<ul style="list-style-type: none"> • IgG
Multiple Sclerosis	<ul style="list-style-type: none"> • Myelin Receptors
Celiac Sprue	<ul style="list-style-type: none"> • Gliaden/gluten
Type I Diabetes	<ul style="list-style-type: none"> • Islet cell receptor
Vitiligo	<ul style="list-style-type: none"> • Melanocyte
Myathenia Gravis	<ul style="list-style-type: none"> • Acetylcholine receptor
Mixed Connective Tissue Disease	<ul style="list-style-type: none"> • Ribonuclear protein
Pernicious anemia	<ul style="list-style-type: none"> • Parietal cell receptor • (aka. Intrinsic factor)
Pemphigus vulgaris	<ul style="list-style-type: none"> • Epidermal anchoring protein receptor • (aka. Intercellular junctions of epidermal cells)
Bullous pemphigoid	<ul style="list-style-type: none"> • Epidermal basement membrane protein
Hashimoto's	<ul style="list-style-type: none"> • Thyroglobulin • Microsomal
Scleroderma	<ul style="list-style-type: none"> • Smooth Muscle • SCL-70
Sjogren's	<ul style="list-style-type: none"> • Rho • La • SSA • SSB
Wegener's	<ul style="list-style-type: none"> • Proteinase • C-ANCA
Polyarteritis Nodosa	<ul style="list-style-type: none"> • P-ANCA
Idiopathic Thrombocytic Purpura	<ul style="list-style-type: none"> • Platelet • (aka glycoprotein IIb/IIIa)

Co-factors for Pyruvate DH, α-ketogluterate DH & Branched Chain DH

(TLC For Nanna)

- TPP.....Thiamin (B1)
- Lipoic Acid.....B4
- CoA.....Pantothenic Acid (B5)
- FAD.....Riboflavin (B2)
- NAD.....Niacin (B3)

Diseases with X-linked Inheritance

Recessive

- Burton's Agammaglobulinemia
- CGD (NADPH Oxidase deficiency)
- Duchenne's Muscular Dystrophy
- Color Blindness
- Hemophilia
- G6PD
- Lesch-Nyhan
- Pyruvate DH deficiency
- Fabry's
- Hunter's

Dominant

- Huntington's
- Vitamin D resistant Rickets

Nephrotic Patterns of Vasculitis

Renal Artery Stenosis.....Clot in front of renal artery
 Renal Failure.....Clot off entire renal artery
 GN.....Inflamed glomeruli
 Papillary Necrosis.....Clot in papilla
 Interstitial Nephritis.....Clot of medulla
 Focal Segmental GN.....Clot off pieces of nephron
 Rapidly Progressive GN.....Clot off lots of nephrons

MC Nephrotic Disease in Adults.....Membranous GN
 MC Renal Dis. in Blacks/Hispanics.....Focal Segmental GN
 MC Renal Disease in HIV/drug users...Focal Segmental GN
 MC Renal Mass.....Cyst
 MC Malignant Renal tumor in adults.....adenocarcinoma
 MC Malignant Renal tumor in kids.....Wilm's tumor

MCC of Rapidly Progressive GN.....Goodpasture's
 MC Nephrotic Disease in kids.....Minimal Change Disease

***RPGN – crescent formations

***Minimal Change Disease – 2 weeks post URI

Thrombolytics and Rescues

- tPa.....Amioncaproic acid
- Streptokinase.....Aminocaproic acid
- Warfarin.....Vitamin K
- Heparin.....Protamine Sulfate

If active hemorrhage give Fresh Frozen Plasma (FFP)

Rashes Associated with Cancer

- Urticaria (hives).....any, but especially lymphoma
- Paget’s Disease.....intraductal carcinoma
- Seborrheic keratosis.....colon cancer (HIV is sudden ↑)
- Actinic keratosis.....squamous cell carcinoma of skin
- Dermatomyositis (heliotropic, malar).....colon cancer
- Acanthosis nigricans....visceral CA & end organ damage
- Erythema nodosum.....granulomatous (nonbacterial)

Cancer Grading – Severity of microscopic changes

Cancer Staging – Degree of dissemination of tumor

Tumor Markers/Oncogenes

l-myc	Small cell carcinoma of the lung
c-myc	Burkitt’s Lymphoma
n-myc	Neuroblastoma
c-abl	CML, ALL
c-myb	Colon, AML
c-sis	Osteosarcoma, glioma, fibrosarcoma
ret	MEN II, MEN III
k-ras	Lung, Colon
bcl-2	Follicular lymphoma (can show up in Burkitts – pick follicular first)
Rb	Retinoblastoma
CEA	Colon, Pancreas
S-100	Melanoma
HER-II, Neu, Erb, BRCA-I & II, p53, CSF-1	Breast

Translocations

- 9:22 Philadelphia Chromosome (CML)
- 8:14 Burkitt’s Lymphoma
- 14:18 Follicular Lymphoma
- 15:17 Promyeloblastic leukemia
- 11:14 Mantle Cell Lymphoma
- 11:22 Ewing’s Sarcoma
- 17:22 Neurofibromatosis

Enzymes Needed to Make Glycogen

- Glycogen synthase
- Branching enzymes
 - glycogen α-1,4 glycosyl transferase
 - glycogen α-1,6 glycosyl transferase

Enzymes Needed to Break Down Glycogen

- Phosphorylase
- Debranching enzyme
- A-1,6-Glucosidase
- Phosphatase

Lipoprotein Transport

- **Chylomicrons:** takes triglycerides from GI to liver & endothelium
- **VLDL:** takes triglycerides from liver to adipose
- **IDL:** takes triglycerides from adipose to tissue
- **LDL:** only one to carry cholesterol
- **VLDL:** only made in the liver
- **IDL + LDL:** break down products of VLDL

Meningitis (MCC)

0 months - 2 months.....Group B strep
E. coli
Listeria

2 months - 10 years.....S. pneumoniae
Neisseria meningitides

10 years – 21 years.....Neisseria meningitides

Over 21 years.....S. pneumoniae

Indications for Pneumovax

- Covers MC 23 strains
- Given at 2, 4 & 6 months
- Given to anyone over 65 years old
- Anyone who is asplenic
- Anyone with end organ damage (CF, RF, Nephrotic)

HIV

Most Common Infection.....CMV
 Most Common Cause of death.....PCP
 p41.....just a surface marker
 GP120.....attachment to CD4
 Pol.....transcription
 Reverse transcriptase.....integration
 p17 and p24 antigens.....assembly

Normal CD4 count: 800-1200 in adults (up to 1500 in kids)

- <500: begin treating with 2 nucleotide inhibitors and 1 protease inhibitor (750 in kids)
- <200: is AIDS, add treatment for PCP
- <100: add treatment for MAC

Characteristics of Autosomal Dominant Inheritance

- Affects males and females equally
- Manifests in heterozygous state
- Can be transmitted by either parent
- Often delayed onset (adult dx)
- Vertical transmission
- New mutations occur in germ cells of older fathers
- Can exhibit reduced penetrance & variable expressivity
- Usually structural defects

Characteristics of Autosomal Recessive Inheritance

- Disease usually does not effect parents
- Disease may be seen in siblings and uncles
- Often early onset (early dx)
- Disease only present when both alleles are mutant
- Horizontal transmission
- Usually enzyme defects (Inborn errors of metabolism)

Characteristics of Mitochondrial Inheritance

- All females will pass on the disease
- No males will pass on the disease
- All offspring of affected females will be affected
- Often affects CNS, heart and skeletal muscle
- Due to uneven cytokinesis during meiosis/oogenesis

Immune System Timeline

< 24 hours	→	swelling
At 24 hours	→	neutrophils show up
Day 3	→	neutrophils peak
Day 4	→	T-cells and MØ show up
Day 7	→	Fibroblasts show up
1 month	→	Fibroblasts peak
3-6 months	→	Fibroblasts are gone

Mitochondrial Diseases

Leigh's Disease: subacute necrotizing encephalomyelopathy, progressive ↓IQ, seizures, ataxia, cytochrome oxidase deficiency

Leber's Disease: hereditary optic atrophy

Tx for Hypercholesterolemia

Statins: P – Pravastatin (only one renally excreted)
A – Atorvastatin
L – Lovastatin
S – Simvastatin } liver enzymes every 3 months

MoA: Inhibit HMG CoA reductase

- Most active around 8pm
- Must take at night for max efficiency

Atrial Action Potential

Phase 0 – depolarization
Phase 1 – No name
Phase 2 – Plateau (A-V Node)
Phase 3 – Repolarization
Phase 4 – Automaticity (S-A Node)

Pneumonia (MCC)

6 wks – 18 yrs: RSV (infants only)
Mycoplasma
Chlamydia pneumonia
Strep. pneumonia

18 yrs – 40 yrs: Mycoplasma
Chlamydia pneumonia
Strep. pneumonia

40 yrs – 65 yrs: Strep. pneumonia
H. influenza
Anaerobes
Viruses
Mycoplasma

Elderly: Strep. pneumonia
Viruses
Anaerobes
H. influenza
Gram negative rods

Oxalate Stones

- In 3 y.o. white female – Cystic Fibrosis
- In 5 y.o. black female – Celiac Sprue
- In Adult female – Whipple's Disease
- In Adult male or female – Crohn's Disease

Pituitary Hormones

Anterior: GH
Prolactin } acidophilic

TSH
ACTH } basophilic
LH
FSH }

Posterior: ADH (supraoptic nucleus)
Oxytocin (paraventricular nucleus)

Sub-Acute Bacterial Endocarditis

- MC bacteria is Strep. viridans
- Roth Spots
- Janeway lesions (toes)
- Osler's nodes (fingers)
- Splinter hemorrhages
- Endocarditis
- Mycotic aneurysm (septic emboli)

Emphysema Types

Bullous.....Due to #1 = Staph. aureus
.....Due to #2 = Pseudomonas

Centroacinar.....Due to smoking

DistalacinarDue to normal aging

Panacinar.....Due to α₁-antitrypsin deficiency

Erythropoiesis

4 months gestation.....Yolk Sac
6 months gestation.....Spleen, Liver, Flat Bones
8 months gestation.....Long Bones
1 year of age.....Long Bones

If long bones become damaged the spleen can take over, resulting in splenomegaly

Diphtheria

- It's toxin ADP ribosylated EF-2
- Stops cell synthesis
- Gram positive
- Acquired exotoxin from a virus via transduction
- Causes heart block
- Never scrap the membrane b/c it is highly vascular so it will bleed and it will also release toxin

Cystic Fibrosis

- Sweat Test: >60 – definitive positive
<20 – Normal
30-60 – Heterozygous
- 2nd messenger is IP₃/DAG
- Gene is on chromosome 7
- Pilocarpine can be used to treat

Inclusion Bodies

Howell-Jolly.....Sickle Cell
 Heinz.....G-6-PD
 Zebra.....Niemann Pick
 Donovan.....Leishmaniasis
 Mallory.....Alcoholism
 Negri.....Rabies
 Councilman.....Yellow Fever
 Call-Exner.....Ovarian tumors
 Lewy.....Parkinsons
 Pick.....Pick’s Disease
 Barr Bodies.....Female
 Aschoff.....Rheumatic Fever
 Cowdry Type A.....Herpes
 Auer Rods.....AML
 Globoid.....Krabbe’s Disease
 Russell.....Multiple myeloma
 Schiller-Duval.....Yolk Sac tumor
 Basal Bodies.....Smooth Muscle

Allergic Response

Primary – CONTACT

- Neutrophils work in the first 3 days
- Then B-cells produce IgM
 - Shows up at 3 days
 - Peaks at 14 days
 - Gone in 2 months
- IgG
 - Show up at 2 weeks
 - Peaks in 2 months
 - Gone in 1 year

Secondary – MEMORY

- IgG shows up at day 3 with 5x the concentration
 - Highest affinity for antigen
 - Peaks in 5 years
 - Stays for 10 years

Amyloidosis

AL	Portion homologous with Ig Light chain	Primary amyloidosis, multiple myeloma
AA	Unique N-terminal sequence	Chronic active disease, Hodgkin’s disease,
Pre-albumin /transthyretin	Single amino acid substitution	Hereditary neuropathy, nephropathy and cardiopathy
AB	B ₂ microglobulin	Cerebral artery amyloid, Alzheimers, Downs,
AE	Endocrine	Aging
AP	Universally associated with all amyloids	

Chelavtors

- Methylene Blue – Methemaglobinemia
- Sodium Thiosulfate – Cyanide
- CaEDTA – Lead (to test)
- Penicillamine – Lead (in plasma)
- Dimeraprol – Lead (in bone marrow)

**Tx for cyanide poisoning:

- Amyl Nitrate
- Sodium thiosulfate
- Methylene Blue
- Transfusion

Renal Tubular Acidosis (acidosis & hypokalemia)

Type I – High urine pH
 Acidosis
 Frequent UTI
 Stones
 Babies die <1 year

Type II – Low urine pH (2)
 Hypokalemia
 NO carbonic anhydrase

Type III – Combo of Type I and II
 Normal urine pH
 Hypokalemia

Type IV – Diabetics
 Hyperkalemia
 NO aldosterone (Infarcted JG apparatus)

Hemolytic Properties of Streptococcus

α- partial hemolysis Green zone
 β- Complete hemolysis Clear zone
 γ- No hemolysis Red zone

Transduction

Bacteria becomes deadly when a virus injects its DNA

Transformation

In a hospital or nursing home the bacteria has become deadly by this mechanism

Conjugation

Only occurs if bacteria has PILI

Coumadin

vs

Heparin

Extrinsic	Intrinsic
Tissue	Blood
PT	PTT
Factors 2,7,9,10	Factor 3
p.o.	i.v.
8-10 hrs delay	immediate
C/I in preg.	Ok in preg.
Inhib Vit K dependant factor	DOC for DVT

(Keep the PeT out side – extrinsic)
 (PeT is Cujo who bites – p.o.)

RASHES

Erythema marginatum	<ul style="list-style-type: none"> • small red spots with bright red margins, sand papery, Rheumatic fever
Erythema chronicum migrans	<ul style="list-style-type: none"> • target lesion, bullseye, Lyme disease
Measles	<ul style="list-style-type: none"> • morbiliform rash, preceded by cough and conjunctivitis
Roseola	<ul style="list-style-type: none"> • fever for 2 days then rash pops up (rash only after fever is gone), HHV 6
Erythema nodosum	<ul style="list-style-type: none"> • tender nodules and redness on the anterior aspect of the legs
Erythema multiforme	<ul style="list-style-type: none"> • red macules, target lesions, allergy and viruses <ul style="list-style-type: none"> ○ Mild – Most common cause is viral (2nd is drugs) ○ Moderate – Stevens Johnson Syndrome ○ Severe – Toxic Epidermal Necrolysis
Seborrheic dermatitis	<ul style="list-style-type: none"> • scaly skin with oily skin on the hairline
Seborrheic keratosis	<ul style="list-style-type: none"> • stuck on wart appearance
Psoriasis	<ul style="list-style-type: none"> • silvery white plaques on extensor surfaces, scaly skin, pitted nails
Varicella Zoster	<ul style="list-style-type: none"> • red macules, papules, vesicles, pustules then scabs: different stages at the same time, HHV 3
Dermatitis herpetiformis	<ul style="list-style-type: none"> • rash/blisters on anterior thigh, associated with diarrhea due to Celiac Sprue flare up
Typhoid fever	<ul style="list-style-type: none"> • rose spots associated with “intestinal fire”, Salmonella Typhi
Dermatomyositis	<ul style="list-style-type: none"> • heliotropic rash
Erysipelas	<ul style="list-style-type: none"> • reddened area with raised borders, does not blanch
Tinea cruris	<ul style="list-style-type: none"> • redness, itchy groin
Pityriasis rosea	<ul style="list-style-type: none"> • herald patch: dry skin patches that follow skin lines, HHV 7
Tinea versicolor	<ul style="list-style-type: none"> • hypo-pigmented macules on the upper back in a “V” pattern
Scabies	<ul style="list-style-type: none"> • linear excoriation on belt line and finger webs

Hepatitis B

Incubation: 4-26 weeks (8 wk average)
 Acute Disease: 4-12 weeks
 Convalescence: 4-20 weeks
 Recovery: years

Acute recent infection	HBcAg+, HBsAg+, (HBcAb +/-)
Recent Immunization (within previous 2 weeks)	HBsAg+ only
Immunization (more than 2 weeks previous)	HBsAb+ only
Previous infection, now immune	HBcAb+, HBsAb+, HBsAg-
Infectious	HBeAg+
Non-infectious	HBeAg-
Chronic carrier	HBsAg+ for more than 6 months (HBsAb+/-)
Window period	HBeAb+, HBcAb+, HBsAg-

HLA Markers	Diseases	Pneumonic
DR-2	Narcolepsy, Allergy, Goodpasture, MS	2 Itchy Sheep (Mary and Sarah), Sleep in a Goodpasture
DR-3	Sjogren's, SLE, Celiac Sprue, Chronic Active Hepatitis	3 S's and Chronic Active Hepatitis
DR-3 & 4	IDDM Type I	
DR-4	Rheumatoid Arthritis, Pemphigus vulgaris	RAP
DR-5	Juvenile Rheumatoid Arthritis, Pernicious Anemia	JRAP
DR-7	Steroid Induced Nephrotic Syndrome	
DR-3 & B-8	Celiac Disease	
A-3	Hemochromatosis	
B-8	Myasthenia Gravis	
B-13	Psoriasis w/o arthritis	
B-27	Psoriasis w/ arthritis, Ankylosing Spondylitis, IBD, Reiter's, Postgonococcal arthritis	2PAIR
BW-47	21- α -Hydroxylase deficiency (Vitamin D)	

Immunoglobulins

IgA	<ul style="list-style-type: none"> • Monomer in the blood • Dimer in secretions • Protects the mucosal surfaces and body secretions
IgD	<ul style="list-style-type: none"> • Only known function is as a surface marker on mature B-cells
IgE	<ul style="list-style-type: none"> • Mediator of Type I hypersensitivity (anaphylaxis) • Parasite defense • Responsible for allergies • Fc portion binds to mast cells and basophils • Does not fix complement
IgG	<ul style="list-style-type: none"> • Second to be produced during the primary immune response • Only one to be produced during the secondary immune response • In memory (secondary) response <ul style="list-style-type: none"> ○ Shows up a 3 days with 5x the concentration of primary response ○ Peaks around 5 years ○ Some remain in circulation for 10 years • Has 4 subclasses (antigenic differences in heavy chains and with disulfide bonds) <ul style="list-style-type: none"> ○ IgG1 – crosses the placenta due to Fc portion ○ IgG2 – most common deficiency, susceptible to encapsulated organisms ○ IgG3 – Most memory antibodies ○ IgG4 – Only one that does not fix complement
IgM	<ul style="list-style-type: none"> • Present only in the primary immune response • Most effective in agglutination and complement fixation • Defense against bacteria and viruses

Hyperlipidemias

Type	Deficiency	Component ↑	Misc Information
I	Lipoprotein Lipase – defect of the liver type only	Chylomicrons	
II	Receptor or receptor enzyme – IIa, IIb, or B100	LDL	Most common in general population
III	APO E receptor	IDL	
IV	Lipoprotein Lipase – defect of the adipose type only	VLDL	
V	Enzyme and receptor defect – APO CII	Chylomicrons & VLDL	Associated with diabetes melitis

Interleukins and Other Inflammatory Mediators

IL-1	<ul style="list-style-type: none"> • Secreted by macrophages • Causes fever and other non-specific symptoms of illness • Recruits T_{helper} cells
IL-2	<ul style="list-style-type: none"> • Secreted by T cells • Most potent • Most powerful Chemotactic factor (recruits everyone) • Must be inactivated prior to transplantation
IL-3	<ul style="list-style-type: none"> • Secreted by T cells • Causes B cell proliferation • Labeled by Thymidine
IL-4	<ul style="list-style-type: none"> • Secreted by T cells • Causes B cell differentiation • Responsible for class switching to IgG and IgE
IL-5	<ul style="list-style-type: none"> • Secreted by T cells • Responsible for class switching to IgA
IL-8	<ul style="list-style-type: none"> • Neutrophil Chemotactic factor
IL-10	<ul style="list-style-type: none"> • Suppresses cell mediated response • Tells macrophages and T-cells to stay away if there is a bacterial infection
IL-12	<ul style="list-style-type: none"> • Promotes cell mediated response • If infection in non-bacterial it is released to recruit macrophages and T cells • Activates NK cells to secrete IF-γ • Inhibits IL-4 induced IgE secretions • Changes T_H cells into T_{H1} cells
IF- α	<ul style="list-style-type: none"> • Secreted by Leukocytes • Inhibits viral replication and tumor growth • Increases NK activity • Increases MHC (class I and II) expression • Interferes with protein synthesis
IF- β	<ul style="list-style-type: none"> • Secreted by fibroblast • Inhibits viral replication and tumor growth • Increases NK activity • Increases MHC (class I and II) expression • Interferes with protein synthesis
IF- γ	<ul style="list-style-type: none"> • Secreted by T-cells and NK cells • Increases NK activity • Increases MHC (class I and II) activity • Increases macrophage activity • Co-stimulates B-cell growth and differentiation • Decreases IgE secretion
TNF- α	<ul style="list-style-type: none"> • aka Cachectin • Secreted by monocytes and macrophages • Induces IL-1 • Increases adhesion molecules and MHC class I on endothelial cells • Is a pyogen • Induces secretion IF-γ • Cytotoxic/Cytostatic
TNF- β	<ul style="list-style-type: none"> • aka Lymphotoxin • Secreted by T-cells • Cytotoxic
TGF- α	<ul style="list-style-type: none"> • Secreted by solid tumors (carcinoma<sarcoma) and monocytes • Induces angiogenesis, keratinocyte proliferation, bone resorption and tumor growth
TGF- β	<ul style="list-style-type: none"> • Secreted by platelets, placenta, kidney, bone, T-cells and B-cells • Induces fibroblast proliferation, collagen synthesis and fibronectin synthesis • Inhibits NK, Lymphokine Activated Killer Cells, Cytotoxic T Lymphocytes, T cell & B cell proliferation • Enhances wound healing and angiogenesis

IL = Interleukin **IF = Interferon** **TNF = Tumor Necrosis Factor** **Transforming Growth Factor**

EKG Breakdown

Portion of EKG	Portion of Heart	Phase of Action Potential
P-wave	Atrium	0
P-R interval	AV node	2
Q-wave	Septum	2
R-upstroke	Anterior wall	2
S-downstroke	Posterior wall	2
S-T interval	Ventricle	2
T-wave	Ventricle	3
U-wave	Ventricle	4

Adhesion Molecules

IgCAM	ICAM-1, ICAL-2, ICAM-3	<ul style="list-style-type: none"> • Homing of lymph nodes to site of inflammation • Found on T-cells, endothelial cells, dendritic cells 	BINDING PROTEINS
	LFA-3	<ul style="list-style-type: none"> • Mediate T-cell interactions • Found on lymphocytes, APC 	
	LFA-2 (CD2)	<ul style="list-style-type: none"> • Found on T-cells, NK cells 	
Integrins	VLA-1 (β 1)	<ul style="list-style-type: none"> • Migration thru extracellular matrix • Widely distributed 	STOPS THE LEUKOCYTES
	LFA-1 (β 2)	<ul style="list-style-type: none"> • Tight binding to endothelium • Found on lymphocytes 	
	CR3 (β 2)	<ul style="list-style-type: none"> • Tight binding to epithelium • Phagocytosis • Mac-1 • CD11/CD18 	
	CR4 (β 2)	<ul style="list-style-type: none"> • Phagocytosis • Opsonin receptor 	
Selectins	E-selectins	<ul style="list-style-type: none"> • Leukocyte migration and homing • Found on activated endothelium 	BIND CARBOHYDRATES MEDIATES “ROLLING” (slows leukocytes)
	L-selectins	<ul style="list-style-type: none"> • Initial binding to endothelium • Found on leukocytes 	
	P-selectins	<ul style="list-style-type: none"> • Leukocyte migration to inflammatory sites • Found on activated endothelium and platelets 	

Hypersensitivities

(ACID)

Type I - Anaphylaxis

- IgE binds to mast cells – degranulates mast cells
- IgA activates IP3 cascade – degrades mast cells

Type II - Cytotoxic (humoral) – Goodpasture, Autoimmune hemolytic anemia

Type III - Immune Complex mediated – Rheumatoid arthritis, SLE

Type IV - Delayed (cell mediated) – TB skin test, contact dermatitis, transplant rejection

Mechanisms of Actions

Drug	Mechanism
5FU	Inhibits thymidylate
Methotrexate	Inhibits dihydrofolate reductase
Hydroxyurea	Inhibits ribonucleotide reductase
Vincristine/Vinblastin	Inhibit microtubule formation
Paclitaxel	Inhibits microtubules from migrating
Levamisole	Stimulates Natural Killer (NK) cells
Steroids	<ol style="list-style-type: none"> 1. Kills T-cell and Eosinophils 2. Inhibits macrophage migration 3. Inhibits phospholipase A 4. Inhibits mast cell degranulation 5. Stabilizes endothelium
Statins	Inhibit HMG CoA reductase
Niacin	Decreases VLDL production in the liver
Sulfonylureas	1 st generation - Block potassium channels in the islet cells preventing insulin release 2 nd generation – Promote insulin release and inhibit gluconeogenesis in the liver
Migliitol/Ascarbose	Inhibit glucose absorption from the GI
Metformin	Stops gluconeogenesis in the liver
Troglitazone	Increases the sensitivity of insulin receptors
Anti-psychotics	Block dopamine receptors
Aspirin	Irreversible inhibitor of cyclo-oxygenase
K ⁺ Sparing Diuretics	Competitive aldosterone receptor antagonist
Topical Anesthetics	Block Na ⁺ channels
Quinalones	Block topoisomerase (supercoils)
Aminoglycosides	Blocks Initiation Factor (IF) 2 on the 30S subunit
Tetracyclines	Blocks tRNA binding on the 30S subunit
Rifampin	Blocks beta subunit of RNA polymerase
Sulfa Drugs	Blocks Para-Amino Benzoic Acid (PABA)
Cephalosporins	Inhibit the cell wall
Penicillins	Block transpeptidase
Chloramphenicol	Blocks peptidyl transferase on the 50s subunit
Clindamycin/Lincomycin	Blocks translocase on the 50s subunit
Macrolides	Blocks translocase on the 50s subunit
Mitronidazole	Increases production of free radicals
Vancomycin	Blocks cell wall (phospholipid)
Benzodiazepine	Increase the frequency of the GABA receptors via Cl ⁻ channels
Barbiturates	Increase the duration of the GABA channels via Cl ⁻ channels
TCA's	Block reuptake of catecholamines, AV conduction and alpha receptors
SSRIs	Block reuptake of Serotonin
MAOIs	Inhibit MAO
Lithium	MOA is unknown but is suspected to be related to it mimicking of Na ⁺
Valproic Acid	Blocks Na ⁺ and sometimes Ca ²⁺
Carbamizapine	Blocks Na ⁺ and Ca ²⁺
Epinephrine	Blocks Beta (2>1) receptors and then Alpha receptors
Antihistamines	1 st generation – blocks H ₁ and H ₂ receptors (H ₁ >H ₂) 2 nd generation – blocks H ₂ only
Decongestants	Alpha agonists

Antibiotic Coverage

	Gram+	Gram+ & S.aureus	Simple Gram-only ³	All Gram- & pseudomonas	Atypicals ¹	Anaerobes	Richetisia	Other
Quinolones		X		X	X			
Aminoglysides				X				
Tetracyclines	X		X		X		X	
Cephalosporins	X		X			X ²		
Penicillins	X					X ²		
Macrolides		X	X		X			
Sulfa Drugs	X		X					
Chloramphenicol		X	X			X		
Clindamycin		X	X			X		
Vancomycin		X				X		*
Mitronidazole						X		**
Rifampin								***

¹ Includes chylmydia, Mycoplasma, ureaplasma and legionella)

² Simple only (no "Big Mama")

³ H.Flu (not B) and E. coli)

* pseudomembranous colitis, MRSA and enterococcus

** protozoa

*** TB